Description

Method for transmitting service data in telecommunication systems with wireless telecommunication based on a predefined radio interface protocol between telecommunication devices, especially voice data and/or packet data in DECT systems

Description of the Related Art

In communication systems comprising a message transmission link between a message source and a message sink, transmitting and receiving devices are used for message processing and transmission, ~~in which devices~~ in these devices:

1) the message processing and message transmission can take place in a preferred direction of transmission (simplex operation) or in both directions of transmission (duplex operation),

2) the message processing is analog or digital,

3) the message transmission takes place via ~~the~~ a long-distance link wirelessly on the basis of various message transmission methods such as FDMA (**F**requency **D**ivision **M**ultiple **A**ccess), TDMA (**T**ime **D**ivision **M**ultiple **A**ccess) and/or CDMA (**C**ode **D**ivision **M**ultiple **A**ccess) - e.g. in accordance with radio standards such as DECT, GSM, WACS or PACS, IS-54, 1S-95, PHS, PDC etc. [cf. IEEE Communications Magazine, January 1995, pages 50 to 57; D.D. Falconer et al: "Time Division Multiple Access Methods for Wireless Personal Communications"] and/or on wires.

"Message" is a generic term which stands both for the meaning (information) and for the physical representation (signal). In spite of the same meaning (i.e., the same information) of a message~~, that is to say the same information,~~ different signal forms can occur. Thus, for example, a message relating to an object can be transmitted:

(1) in the form of an image,

(2) as a spoken word,

(3) as a written word,

(4) as an encrypted word or image.

In this context, the type of transmission according to (1) through (3) is normally characterized by continuous (analog) signals whereas in the type of transmission according to (4), discontinuous signals (e.g. pulses and digital signals) are usually produced.

On the basis of this general definition of a communication system, the invention relates to a method for transmitting service data in telecommunication systems with wireless telecommunication based on a predefined radio interface protocol between telecommunication devices, especially voice data and/or packet data in DECT systems.

The wireless transmission of service data – e.g., the transmitting and receiving of, for example, voice data and/or packet data over the radio path over relatively large distances – between telecommunication devices, which are spatially separate

from one another, are constructed as data sources and data sinks. ~~source and data sink~~ These ~~and~~ can be connected by wireless telecommunication, of a telecommunication system or, ~~respectively,~~ a telecommunication network (which is the scenario for the long-distance transmission of service data), can take place with the aid of DECT (digital enhanced cordless telecommunication) technology, e.g., according to the publication *"Vortrag von A. Elberse, M. Barry, G. Fleming zum Thema:* (lecture by A. Elberse, M. Barry, G. Fleming on the subject): *"DECT Data Services - DECT in Fixed and Mobile Networks", June 17/18, 1996, Hotel Sofitel, Paris; pages 1 to 12 and summary"* in conjunction with the printed documents **(1)** *"Nachrichtentechnik Elektronik 42 (1992) Jan/Feb No. 1, Berlin, DE; U. Pilger "Struktur des DECT-Standards"* (structure of the DECT standard), *pages 23 to 29;* **(2)** ETSI publication *ETS 300175-1...9, October 1992;* **(3)** *Components 31 (1993), Vol. 6, pages 215 to 218; S. Althamrner, D. Brückmann: "Hochoptimierte IC's für DECT-Schnurlostelefone"* (highly optimized ICs for DECT cordless telephones); **(4)** *WO 96/38991 (cf. Figures 5 and 6 and the respective associated description);* **(5)** *Training sheets – Deutsche Telecom, Vol. 48, 2/1995, pages 102 to 111;* ***(6)****: WO 93/21719 (Figure 1 to 3 and the associated description).*

The DECT standard describes a radio access technology for wireless telecommunication in the frequency band from 1880 MHz to 1900 MHz with GFSK (Gaussian frequency shift keying) modulation and a Gaussian filter characteristic of BT = 0.5. The

DECT technology enables any telecommunication network to be accessed. In addition, the DECT technology supports a multiplicity of different applications and services. The DECT applications comprise, e.g., telecommunication in the home (residential cordless telecommunication), accesses to the public PSTN, ISDN, GSM and/or LAN network, the WLL (wireless local loop) scenario and the CTM (cordless terminal mobility) scenario. The telecommunication services supported are e.g. voice, fax, modem, E-mail, Internet, X.25 services etc.

The DECT standard provides various methods for transmitting service data, especially the protected transmission of voice data and/or packet data (cf. ETSI publication ETS 300175—4, September 1996, chapter 12). It is necessary to divide the service data to be transmitted into data units or data packets which are suitable for transmission (protocol data unit PDU). The protocol data units are adapted to the DECT radio interface protocol, especially to the DECT-related TDMA structure and to the various types of transmission for transmitting service data (cf. ETSI publication ETS 300175-4, September 1996, chapter 12, especially tables 21 to 26). For dividing the service data into the protocol data units, the DECT standard also contains a segmenting mechanism or segmenting procedure, respectively, which allows only a single service data unit (SDU) or possibly only a single fragment of a service data unit to be transmittable in each protocol data unit.

Figure 1 shows in a basic representation, not true to scale, a service data transmission scenario in which, e.g., three service data units, a first service data unit SDU1, a second service data unit SDU2 and a third service data unit ~~SDU 3~~ SDU3 are transmitted in accordance with the DECT radio interface protocol in a transmission session for transmitting service data in a DECT system, for example, between a DECT base station used as transmitter or, ~~respectively,~~ receiver and a DECT mobile part used as receiver or, ~~respectively,~~ transmitter.

For this transmission session, a predetermined number of protocol data units PDU, a first protocol data unit PDU1, a second protocol data unit PDU2, a third protocol data unit PDU3 and a fourth protocol data unit PDU4, which are adapted to the DECT radio interface protocol, especially to the DECT-related TDMA structure and to the various types of transmission for the service data transmission, are available which in each case essentially have a predefined basic structure and which are transmitted successively according to the DECT radio interface protocol. The basic structure of the protocol data unit header PDU1 through PDU4 in each case consists of an introductory part ELT, the so-called PDU header, and information field INF and a data field DAF which are arranged in the specified order in the protocol data units PDU1 through PDU4.

The information field INF contains a first information it IN1 and an extension configured as bit. The extension co

of a second information item 1N2 representing the value "0" of the bit or of a third information item 1N3 representing the value "1" of the bit. In the text which follows, it will be explained what meaning the individual information items have.

In the specified transmission session, the first service data unit SDU1 is transmitted in the first protocol data unit PDU1, the second service data unit SDU2 is transmitted in the second protocol data unit PDU2 and the third service data unit SDU3 is transmitted in the third protocol data unit PDU3 and the fourth protocol data unit PDU4.

First protocol data unit PDU1

The first service data unit SDU1 is packed into the data field DAF of the first protocol data unit PDU1 by the transmitting telecommunication device (transmitter) of the DECT system. ~~So~~ that the receiving telecommunication device (receiver) can evaluate (detect) how large the length of the service data in the data field DAF of the first protocol data unit PDU1 is and whether the service data contained in the data field DAF ~~r~~represent a fragment of the first service data unit SDU1 or, ~~respectively,~~ the non-end of the first service data unit SDU1 or the complete first service data unit SDU1 or, ~~respectively,~~ the end of the first service data unit SDU1, ~~the information field INF containing the information items INI. . . .1N3 is provided after the header part ELT.~~

In the present case, the first information item IN1 specifies the length of the first service data unit SDU1 because the first service data unit SDU1 is smaller than the data field DAF of the first protocol data unit PDU1, whereas the second information item 1N2 specifies that the service data contained in the data field DAF represent the complete first service data unit SDU1 and that the end of the first service data unit SDU1 is present. The third information item IN3, which, in principle, is also possible as an extension, is shown in parentheses in the present case in Figure 1.

Since the first service data unit SDU1 is smaller than the data field DAF of the first protocol data unit PDU1 and, for the transmission of service data, the condition holds that only one service data unit SDU at least configured as a fragment can be transmitted in each protocol data unit PDU, the shaded area of the data field DAF in Figure 1 remains unused for the transmission of service data. Ultimately, this has the result that the radio channel capacity available in accordance with the DECT standard is not optimally utilized. In other words, the bandwidth available in the DECT system for the telecommunication is poorly utilized.

In addition, this also results in a deterioration in the transmission rate in the transmission of service data.

This type of service data transmission also leads to the result that, when a service data unit is lost due to transmission

disturbances on the radio link between the DECT base station and the DECT mobile part, the resultant greater transmission period cannot be made up or compensated for in the service data transmission (occurrence of lost time). This means that the quantity of service data to be transmitted in the telecommunication device (DECT base station and/or DECT mobile part) is maintained, ~~that is to say not decreased,~~ i.e., not decreased. It is maintained even though the quality of transmission of the transmission link between the telecommunication devices may only be temporarily poor, and that after another disturbance of the transmission link, an intervention into the data transfer is necessary because the quantity of service data becomes greater and greater.

So that this disadvantageous unwanted phenomenon will not occur in the first place, it is possible, according to the DECT standard, to provide a fixed spare capacity in the protocol data unit for transmitting service data which can be used in the case of transmission losses.

Second protocol data unit PDU2

The second service data unit SDU2 is packed into the data field DAF of the second protocol data unit PDU2 by the transmitting telecommunication device (transmitter) of the DECT system. ~~So~~ that the receiving telecommunication device (receiver) can evaluate (detect) how large the length of the service data in the data field DAF of the second protocol data unit PDU2 is,

and whether the service data contained in the data field DAF represent a fragment of the second service data unit SDU2 ~~respectively,~~ the non-end of the second service data unit SDU2 or the complete second service data unit SDU2 or, respectively, the end of the second service data unit SDU2~~, the information field INF containing the information items IN1...1N3 is provided after the header part ELT.~~

In the present case, the first information item IN1 specifies the service data length of the second service data unit SDU2 because the second service data unit SDU2 is exactly as large as the data field DAF of the second protocol data unit PDU2, whereas the second information item ~~1N2~~ IN2 specifies that the service data contained in the data field DAF represent the complete second service data unit SDU2 and that the end of the second service data unit SDU2 is present. The third information item IN3, which, in principle, is also possible as an extension, is represented in "0" in Figure 1 in the present case.

Since the second service data unit SDU2 is exactly as large as the data field DAF of the second protocol data unit PDU2, the data field DAF of the second protocol data unit PDU2 is completely utilized for the transmission of service data in the present case. The phenomenon described above is in conjunction with the transmission of the first service data unit

SDU1 will therefore not occur in the present case.

Third protocol data unit PDU3 and fourth protocol data unit PDU4

The third service data unit SDU2 is packed into the data field DAF of the third protocol data unit PDU3 and the fourth protocol data unit PDU4 by the transmitting telecommunication device (transmitter) of the DECT system because the third service data unit SDU3 is larger than the data field DAF of the third protocol data unit PDU3. The third protocol data unit PDU3 is therefore completely filled with a corresponding first fragment FR1 of the third service data unit SDU3, whereas the remainder of the third service data unit SDU3, a second fragment FR2, is packed into the fourth protocol data unit PDU4. ~~So~~ that the receiving telecommunication device (receiver) can evaluate (detect) how large the length of the service data in the data field DAF of the third protocol data unit PDU3 is ~~and~~ whether the service data contained in the data field DAF represent a fragment of the third service data unit SDU3 ~~or, respectively~~, the non-end of the third service data unit SDU3 ~~or~~ the complete third service data unit SDU3 or, ~~respectively,~~ the end of the third service ~~data unit SDU3, the information field INF containing the information items IN1...IN3 is provided after the header part ELT~~.

In the present case, the first information item IN1 in the third protocol data unit PDU3 specifies the service data length of the first fragment FR1 of the third service data unit SDU2, whereas the third information item ~~IN3~~ specifies that the service

data contained in the data field DAF represent the first fragment FR1 of the third service data unit SDU3 and that the non-end of the third service data unit SDU3 is present. The second information item IN2, which, in principle, is also possible as extension, is shown in "()" in Figure 1 in the present case.

Since the first fragment FR1 of the third service data unit SDU3 is exactly as large as the data field DAF of the third protocol data unit PDU3, the data field DAF of the third protocol data unit PDU3 is completely utilized for the transmission of service data in the present case. The phenomenon described above in conjunction with the transmission of the first service data unit SDU1 will therefore not occur in the present case.

In the fourth protocol data unit PDU4, the first information item IN1 specifies the service data length of the second fragment FR2 of the third service data unit SDU3, whereas the second information item IN2 specifies that the service data contained in the data field DAF represent the second fragment FR2 of the third service data unit SDU3, that the second fragment FR2 represents the remainder of the third service data unit SDU3, and that the end of the third service data unit SDU3 is present. The third information item IN3 which, in principle, is also possible as extension, is shown in "()" in Figure 1 in the present case.

The transmission session is ended at least temporarily with the transmission of the service data units SDU1 through SDU3. This means, e.g., for the downlink, that the DECT base station has no

more service data to be transmitted by it to the DECT mobile part at the moment. The DECT mobile part is automatically informed of this non-transmission state (default state) by the following facts. First, ~~fact, firstly,~~ according to the predetermined transmission protocol mentioned above – which says that in each protocol data unit, only a single service data unit (SDU) or possibly only a single fragment of a service data unit can be transmitted - only the second fragment FR2 of the third service data unit SDU3 is transmitted in the fourth protocol data unit SDU4. Second ~~and that, secondly~~, no further protocol data unit containing service data is sent to the DECT mobile part by the DECT base station. The above statements for the downlink can also be transferred to the case where the transmission session occurs on the uplink.

Since the second fragment FR2 of the third service data unit SDU3 is smaller than the data field DAF of the fourth protocol data unit PDU4 and, for the transmission of service data, the condition holds that only one service data unit SDU configured at least as a fragment can be transmitted in each protocol data unit PDU, the shaded area of the data field DAF in Figure 1 remains unused for the transmission of service data. Ultimately, this has the result that the radio channel capacity available in accordance with the DECT standard is not optimally utilized. In other words, the band width available in the DECT system for telecommunication is poorly utilized.

In addition, this also results in a deterioration in the transmission rate in the transmission of service data.

This type of service data transmission also leads to the result that, when a service data unit is lost due to transmission disturbances on the radio link between the DECT base station and the DECT mobile part, the resultant greater transmission period cannot be made up or compensated for in the service data transmission (occurrence of lost time). This means that the quantity of service data to be transmitted in the telecommunication device (DECT base station and/or DECT mobile part) is maintained, ~~that is to say~~ i.e., not decreased, even though the quality of transmission of the transmission link between the telecommunication devices may only be temporarily poor, and that after another disturbance of the transmission link, an ~~is~~ intervention into the data transfer is necessary because the quantity of service data becomes greater and greater.

European Patent EP 0 708 576 ~~A2~~ discloses a method for the transmission of payload data in telecommunication systems ~~wherein~~ where the concern is how payload data blocks fashioned as CDMA data packets can be transmitted in ATM cells fashioned as data units. A distinction is made between a multiplex mode and a non-multiplex mode for this transmission. In the non-multiplex mode, a first control octet is contained in the information field of an ATM cell, whereas the first control octet and a second control octet are

contained in the information field of the ATM cell in the multiplex mode. The first control octet contains an ACO field with one bit length and a PL field with six bit lengths and a parity field with one bit length. The ACO field indicates whether the first control octet is immediately followed by the second control octet or not. Regardless of whether the first control octet is followed by a second control octet, the PL field indicates the packet length of the CDMA data packet that immediately follows the control octet or the control octets. The parity field serves for error recognition.

SUMMARY OF THE INVENTION

The object ~~forming the basis~~ of the invention consists in transmitting service data in telecommunication systems with wireless telecommunication based on a predefined radio interface protocol between telecommunication devices, especially voice data and/or packet data in DECT systems, with enhanced utilization of the bandwidth ~~band width~~ of the telecommunication system and at a greater transmission rate.

~~This object is achieved by the features of patent claim 1.~~

The basic concept of the invention ~~consists in~~ comprises transporting service data units to be transmitted, in the transmission of service data in telecommunication systems with wireless telecommunication based on a predefined radio interface protocol between telecommunication devices, especially voice data and/or packet data in DECT systems, cascaded (in the form of a cascade arrangement) by radio in protocol data units adapted to the radio interface protocol. The protocol data units in each case contain the same number of information fields, configured especially as length indicators for specifying the respective length of the service data, as there are service data units or, respectively, fragments of service data units contained in the respective protocol data unit. In addition, each information field contains an extension (a reference) in the form of a concatenated list whether further service data units or, ~~respectively~~, further fragments of service data units follow in the respective protocol data unit.

This procedure (method) ~~(this method)~~ enables the transmission capacity in the telecommunication system or, ~~respectively~~, the bandwidth ~~band width~~ of the telecommunication system to be optimally utilized and time delays in the transmission of service data, ~~e.g.~~ e.g., due to transmission disturbances or short-time overloading to be compensated with a higher data transmission rate than the possible one absent the inventive method.

Advantageous further developments of the invention are specified in the subclaims.

An illustrative embodiment of the invention will be explained with reference to Figure 2.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Based on Figure 1, Figure 2 shows, by ~~means~~ way of a basic ~~representation which is also not true to scale, a service data~~ not-to-scale representation, a service data transmission scenario in which, in a transmission session for transmitting service data in a DECT system, ~~for example~~ (for example, between a DECT base station used as transmitter and, respectively, receiver and a ~~30~~ DECT mobile part used as receiver and, ~~respectively,~~ transmitter, ~~e.g.~~ (e.g.,) three service data units, a fourth data service unit SDU4, a fifth service data unit SDU5 and a sixth service data unit SDU6 are transmitted in accordance with the DECT radio interface protocol.

For this transmission session, a predetermined number of protocol data units PDU, a fifth protocol data unit PDU5, a sixth protocol data unit PDU6 and a seventh protocol data unit PDU7, which are adapted to the DECT radio interface protocol, especially to the DECT-oriented TDMA structure and to the different alternatives are available, which like the protocol data units PDU1 through PDU4 in Figure 1, in each case essentially have a predetermined basic structure and which are transmitted successively in accordance with the DECT radio interface protocol. The basic structure of the protocol data units PDU5 through PDU7 in each case again consists of the header part ELT,

the ~~so-called~~ PDU header, the information field INF and the data field DAF which are arranged in the specified order in the protocol data units PDU5 through PDU7.

The information field INF again contains the first information item IN1 and the extension configured as bit. The extension again consists either of the second information item ~~IN2~~ IN2 representing the value "0" of the bit or of the third information item ~~IN3~~ IN3 representing the value "1" of the bit. The meaning of the individual information items is identical with the meaning of the information items in Figure 1.

In the specified transmission session, the fourth service data unit SDU4 is transmitted in the fifth protocol data unit PDU5, the fifth service data unit SDU5 is transmitted in the fifth protocol data unit PDU5 and the sixth protocol data unit PDU6, and the sixth service data unit SDU6 is transmitted in the sixth protocol data unit PDU6 and the seventh protocol data unit PDU7.

Fifth protocol data unit PDU5

The fourth service data unit SDU4 is packed into the data field DAF of the fifth protocol data unit PDU5 by the transmitting telecommunication device (transmitter) of the DECT system. ~~So~~ As that the receiving telecommunication device (receiver) can evaluate (detect) how large the service data length of the service data in the data field DAF of the fifth protocol data

unit PDU5 ~~is~~ and whether the service data contained in the data field DAF represent a fragment of the fourth service data unit SDU4 ~~or~~ the non-end of the fourth service data unit SDU4 ~~or~~ the complete fourth service data unit SDU4 or, ~~respectively,~~ the end of the fourth service data unit ~~SDU4, the information field INF containing the information items IN1...IN3 is preferably provided after the header part ELT.~~

In the present case, the first information item IN1 specifies the length of the fourth service data unit SDU4 because the fourth service data unit SDU4 is smaller than the data field DAF of the fifth protocol data unit PDU5, whereas the second information item ~~IN2~~ specifies that the service data contained in the data field DAF represent the complete fourth service data unit SDU4 and that the end of the fourth service data unit SDU4 is present. The third information item IN3, which, in principle, is also possible as extension, is shown in "()" in Figure 2 in the present case, as in Figure 1.

Since the fourth service data unit SDU4 is ~~20~~ smaller than the data field DAF of the fifth protocol data unit PDU5, a data segment – the shaded area as in Figure 1 - of the data field DAF is not needed for the transmission of the fourth service data unit SDU4. In distinction from Figure 1, this segment is filled essentially with service data of the fifth service data unit SDU5 by the transmitting telecommunication device (transmitter) of the DECT system if service data are still be to transmitted. The

restriction to "essentially" must be made because the information field INF with the information items IN1 through IN3 is again needed with the transmission of service data of the fifth service data unit SDU5 in the fifth protocol data unit PDU5.

The information field is required so that the receiving telecommunication device (receiver) can evaluate (detect) whether the service data contained in the free data segment of the data field DAF in the fifth protocol data unit PDU5 represent a) a fragment of the fifth service data unit SDU5, b) ~~or, respectively,~~ the non-end of the fifth service data unit SDU5 or the complete fifth service data unit SDU5 or, d) ~~respectively,~~ the end of the fifth service data unit SDU5 and how large the service data length of the service data is in the free data segment of the data field DAF in the fifth protocol data unit PDU5.

The information field INF is preferably located following the fourth service data unit SDU4 and preceding the service data of the fifth service data unit SDU5 in the fifth protocol data unit PDU5.

Since the fifth service data unit SDU5 is larger than the free data segment of the data field DAF in the fifth protocol data unit PDU5, the fifth protocol data unit PDU5 is preferably completely filled with a corresponding third fragment FR3 of the fifth service data unit SDU5. In the information field INF following the fourth service data unit SDU4 in the fifth protocol data unit PDU5, the first information item IN1 in the fifth

protocol data unit PDU5 specifies the service data length of the third fragment FR3 of the fifth service data unit SDU5, whereas the third information item IN3 specifies that the service data contained in the data segment of the data field DAF represent the third fragment FR3 of the fifth service data unit SDU5 and that the non-end of the fifth service data unit SDU5 is present. The second information item IN2, which, in principle, is also possible as extension, is represented in parentheses in Figure 2 in the present case, as in Figure 1.

Since the third fragment FR3 of the fifth service data unit SDU5 is preferably just as large as the (free) data segment of the data field DAF in the fifth protocol data unit PDU5, the data field DAF of the fifth protocol data unit PDU5 is completely utilized for transmitting the service data in the present case. The phenomenon described in conjunction with the transmission of the first service data unit SDU1 in Figure 1 will not, therefore, occur in the present case.

Sixth protocol data unit PDU6

The service data of the fifth service data unit SDU5, which did not fit into the fifth protocol data unit PDU5, are packed into the data field DAF of the sixth protocol data unit PDU6 by the transmitting telecommunication device (transmitter) of the DECT system. So that the receiving telecommunication device (receiver) can evaluate (detect) how large the length of the

service data is in the data field DAF of the sixth protocol data unit PDU5 ~~and~~ whether the service data contained in the data field DAF represent a fragment of the fifth service data unit SDU5 ~~or, respectively,~~ the non-end of the fifth service data unit SDU5 ~~or~~ the complete fifth service data unit SDU5 or, ~~respectively~~, the end of the fifth service data unit SDU5, ~~the information field INF containing the information items IN1 .. IN3 is preferably provided following the header part ELT.~~

In the present case, the first information item IN1 specifies the service data length of the fourth fragment FR4 because a fourth fragment FR4 of the fifth service data unit SDU5 - which contains the service data of the fifth service data unit SDU5 which did not fit into the fifth protocol data unit PDU5 - is smaller than the data field DAF of the sixth protocol data unit PDU6, whereas the second information item ~~IN2~~ IN2 specifies that the service data contained in the data field DAF now represent the complete fifth service data unit SDU5 and that the end of the fifth service data unit SDU5 is present. The third information item IN3, which, in principle, is also possible as extension, is shown in ~~"()"~~ parentheses in Figure 2 in the present case, as in Figure 1.

Since the fourth fragment FR4 of the fifth service data unit SDU5 is smaller than the data field DAF of the sixth protocol data unit PDU6, a data segment - the shaded area as in Figure 1 - of the data field DAF is not needed for transmitting the fifth service data unit SDU5. In distinction from Figure 1, this

segment is filled essentially with service data of the sixth service data unit SDU6 by the transmitting telecommunication device (transmitter) of the DECT system if service data are still be to transmitted. The restriction to "essentially" must be made because the information field INF with the information items IN1 through IN3 is again needed with the transmission of service data of the sixth service data unit SDU6 in the sixth protocol data unit PDU6.

The information field is required so that the receiving telecommunication device (receiver) can evaluate (detect) whether the service data contained in the free data segment of the data field DAF in the sixth protocol data unit PDU6 represent a) a fragment of the sixth service data unit SDU6 ~~or, respectively,~~ b) the non-end of the sixth service data unit SDU6 ~~or~~ c) the complete sixth service data unit SDUE or, ~~respectively~~ d), the end of the sixth service data unit SDU6 and how large the service data length of the service data is in the free data segment of the data field DAF in the sixth protocol data unit PDU6.

The information field INF is preferably located following the fourth fragment FR4 of the fifth service data unit SDU5 and preceding the service data of the sixth service data unit SDU6 in the sixth protocol data unit PDU6.

Since the sixth service data unit SDU6 is larger than the free data segment of the data field DAF in the sixth protocol data unit PDU6, the sixth protocol data unit PDU6 is preferably

completely filled with a corresponding fifth fragment FR5 of the sixth service data unit SDU6. In the information field INF following the fourth fragment FR4 of the fifth service data unit SDU5 in the sixth protocol data unit PDU6, the first information item IN1 in the sixth protocol data unit PDU6 specifies the service data length of the fifth fragment FR5 of the sixth service data unit SDU6, whereas the third information item IN3 specifies that the service data contained in the data segment of the data field DAF represent the fifth fragment FR5 of the sixth service data unit SDU6 and that the non-end of the sixth service data unit SDU6 is present. The second information item IN2, which, in principle, is also possible as extension, is represented in parentheses in Figure 2 in the present case, as in Figure 1.

Since the fifth fragment FR5 of the sixth service data unit SDU6 is preferably just as large as the (free) data segment of the data field DAF in the sixth protocol data unit PDU6, the data field DAF of the sixth protocol data unit PDU6 is completely utilized for the transmission of service data in the present case. The phenomenon described in conjunction with the transmission of the first service data unit SDU1 in Figure 1 will not, therefore, occur in the present case.

Seventh protocol data unit PDU7

The service data of the sixth service data unit SDU6, which did not fit into the sixth protocol data unit PDU6, are packed into the data field DAF of the seventh protocol data unit PDU7 by the transmitting telecommunication device (transmitter) of the DECT system. ~~So~~ that the receiving telecommunication device (receiver) can evaluate (detect) how large the service data length of the service data is in the data field DAF of the seventh protocol data unit PDU7 ~~and~~ whether the service data contained in the data field DAF represent a fragment of the sixth service data unit SDU6 ~~or, respectively~~, the non-end of the sixth service data unit SDU6 ~~or~~ the complete sixth service data unit SDU6 or, ~~respectively,~~ the end of the sixth service data unit ~~SDU6, the information field INF containing the information items IN1...1N3 is preferably provided following the header part ELT.~~

In the present case, the first information item IN1 specifies the service data length of the sixth fragment FR6 because a sixth fragment FR6 of the sixth service data unit SDU6 – which contains the service data of the sixth service data unit SDU6 which did not fit into the sixth protocol data unit PDU6 – is smaller than the data field DAF of the seventh protocol data unit PDU7, whereas the second information item ~~IN2~~ IN2 specifies that the service data contained in the data field DAF now represent the complete sixth service data unit SDU6 and that the end of the sixth service data unit SDU6 is present. The third information

item IN3, which, in principle, is also possible as an extension, is shown in parentheses "()" in Figure 2 in the present case, as in Figure 1.

The transmission session is ended at least ~~10~~ temporarily with the transmission of the service data units SDU4 through SDU6. This means, e.g., for the downlink, that the DECT base station, at the moment, has no further service data which it has to transmit to the DECT mobile part. In distinction from Figure 1, the DECT mobile part must be separately informed of this non-transmission state (default state). A special information item specifying this default state is therefore preferably transmitted in the seventh protocol data unit PDU7 at the conclusion of the transmission session within the framework of the information field. The special information item preferably consists of the second information item ~~IN2~~ IN2 and a fourth information item ~~IN4~~ IN4. The fourth information item ~~IN4~~ IN4 specifies that the service data length of the following service data unit has the length "0". This only means that no further service data are transmitted or, ~~respectively~~, sent by the DECT base station to the DECT mobile part, at least temporarily. The above statements for the downlink can also be transferred to the case where the transmission session takes place on the uplink.

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